

the Botanical Section," is issued with this part. It contains the Thalamiflorals. Other portions will follow year by year. The next will give the Calyciflorals; the third, the Coralliflorals; the fourth, Apetalous Plants; and the fifth and last, the Endogens, Gymnosperms, and Vascular Cryptogams.

Proceedings and Transactions of the Nova-Scotian Institute of Natural Science of Halifax, Nova Scotia. Vol. v. part iii. for 1880-81. Svo. Pp. 223-315. Halifax, N.S., 1881.

CONTINUATIONS of geological research in Nova Scotia, by the Rev. Dr. D. Honeyman, Professor of Geology in Dalhousie College, and detailed descriptions of lievrite and of the trap-minerals of Nova Scotia, by Edwin Gilpin, Government Inspector of Mines, and some Geological Notes by A. Cameron and Alfred Hare, constitute a goodly portion of this part. In Botany, Dr. Somers treats of the Fungi and Mosses of the country; and Mr. A. W. Mackay enumerates the Lichens. The birds of prey have an interesting memoir by Dr. J. B. Gilpin, an acute observer. He states that the Rev. Mr. Wainwright, a missionary in Labrador, with good eye and hand, shot an eagle rising eight feet from the ground with a fisherman's child in its claws, and dropped it so cleverly as not to hurt its living prey. Dr. Gilpin also gives a lively account of the dwellings of the Muskrat and Beaver of Nova Scotia. The ice-storm of January 1881 is noted by H. S. Poole, F.G.S., and Mr. R. Morrow, among the miscellaneous materials of this useful and interesting number of the Nova-Scotian Institute's Proceedings.

MISCELLANEOUS.

On the Origin of the Spermatozoids in the Hydroids.
By M. A. DE VARENNE.

In a preceding note I had the honour of presenting to the Academy a summary of my researches upon the origin of the ovum in the Hydroids*; and I now wish to communicate the results to which my observations on the origin of the male sexual products in the same group have led me.

In the species that I have observed the mother cells of the spermatozoids appear not in the gonophores, medusoid buds, or Medusæ, as has hitherto been supposed, but in the tissues of the colony itself, in what Allman calls the *cœnosarc*. Weismann has lately described the same phenomenon in the genus *Plumularia*; but he thinks that it occurs with the spermatic cells only in this genus. I regret that I cannot adopt his opinion.

* See 'Annals,' October 1881, vol. viii. p. 321.

The three species that I have studied are *Campanularia flexuosa*, *Gonothryea Loveni*, and *Podocoryne carneae*. I selected these three species for the purpose of following a course parallel to that which I pursued in regard to the development of the ovum. The first has its sexual generation represented by gonophores, which remain constantly attached to the hydroid polype; the second presents a semi-medusa, and the third a free medusa.

I find it impossible to share the opinion of those authors who accept the ectodermic origin of the male sexual products in these species.

In *Campanularia flexuosa* we find in the endoderm of the stem before the appearance of any gonophores, some large highly-refrangent cells; these are the *primitive mother-cells*. They are round, and possess large nuclei with a nucleolus. The presence of a certain number of mother cells induces the formation of a gonophore, which is at first only a simple caecal diverticulum of the endoderm and ectoderm. The endoderm of this diverticulum is thus occupied by a certain number of mother cells; and at this moment we can ascertain that the intermediate lamella certainly passes over these differentiated cells, and that consequently the origin of the testis is certainly endodermic.

It is very important, for the recognition of these facts, to observe the gonophores as young as possible, when the large mother cells, which are known by their refringency, occupy the endodermic wall of the body of the polype and are in immediate contact with the digestive cavity of the colony, and when the caecal diverticulum above mentioned begins to make its appearance. In fact, after this moment the primitive mother cells multiply rapidly, and the daughter cells, which are much smaller and always possess refringent nuclei, form a testicular mass of a horseshoe form, which very rapidly increases in size. At the same time the testicular mass ceases to form part of the endodermic wall, and to be in direct contact with the digestive cavity of the colony; for the non-differentiated endoderm, previously interrupted at this point by the testicular mass, becomes reconstituted beneath this mass, and there forms a continuous layer. Thus, in consequence of this multiplication of the mother cells and the reconstruction of an uninterrupted endodermic layer beneath the testicular mass, it is very difficult at this moment to recognize the origin of the testis, which has become an isolated mass, between the ectoderm and the endoderm reconstructed beneath it; and in consequence of there being this endoderm of new formation, which may be mistaken for the primitive endoderm, beneath the testicular mass, one may very easily suppose that the intermediate lamella passes beneath the mother cells, and that therefore the origin of the spermatozooids is ectodermic. It is this, I believe, that has led into error the authors who accept the ectodermic origin of the male sexual products.

In *Gonothryea Loveni* the affair takes place in the same manner, and I need not dwell upon it further.

In *Podocoryne carneae*, in the region of the body of the hydroid

polype where the medusæ are to bud forth, we find the endodermic wall occupied by large refringent cells; these are the primitive mother cells. Soon the endoderm and the ectoderm form a cæcal diverticulum, into which the mother cells pass. This diverticulum will become a medusa; and the mother cells will occupy its endoderm; the intermediate lamella passes over them.

I will not enter into the details of the development of the medusa, as I shall soon have the honour of laying before the Academy a memoir upon this subject. It will suffice to say that after this period the testicular mass grows rapidly, that the endoderm is reconstituted in the form of a new uninterrupted layer beneath this testicular mass, and that the mass of spermatozoids finally occupies the manubrium of the medusa between the ectoderm, which has become considerably thinner, and the newly-formed layer of endoderm already mentioned.

To sum up, in these three species

1. The male sexual products do not originate in the gonophores, medusoid buds, or medusæ, as has been supposed, but in the *cœnosarc* of the hydroid polype itself, as I have already shown to be the case with the ovum.

2. The primitive mother cells of the spermatozoids are derived, like the ova, from differentiated endodermic cells.

3. Like the ova again, these mother cells pass into a diverticulum of the walls of the body; and this diverticulum by development becomes a gonophore, destined to be always attached to the hydroid polype, or a semimedusa, or a free medusa.

4. The origin of the sexual products and their development therefore present a very great analogy in the male and female colonies.

5. If we accept these facts as demonstrated, the gonophores, the semimedusæ, and the medusæ in both the male and female colonies can be regarded only as representing the sexual individuals; and it consequently appears that alternation of generations cannot be accepted.—*Comptes Rendus*, December 12, 1881, p. 1032.

On the Phenomena of Division in Euglypha alveolata and the Monothalamic Rhizopods in general. By DR. AUG. GRUBER.

The investigations of Dr. Gruber upon the phenomena of the multiplication by division in *Euglypha alveolata* and other Monothalamic Rhizopods reveal important facts in the history of these creatures. They show especially how the envelopes of the body being more or less supple or resistant, influence the mode in which division is effected.

If we group the Monothalamia in accordance with the nature of their covering, we may form a first category for those of which the carapace consists of little plates of various forms produced by the sarcodæ of the animal itself. It is here that we must place the species upon which the author has made the most complete investigations.